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Application Number

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08/879475

NOV 20 1997

Paper No.

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United States Patent Application Publication No. _____, page, _____ line _____.

United States Patent Number 5889386, column _____, line, _____ or

WIPO Pub. No. _____, page _____, line _____.

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Darlene Jones

Signature

Darlene Jones

Typed or printed name

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Telephone Number

11/21/05

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United States Patent ^[19]

Koenck

[11] Patent Number: 5,889,386
[45] Date of Patent: Mar. 30, 1999

[54] BATTERY CONDITIONING SYSTEM HAVING COMMUNICATION WITH BATTERY PARAMETER MEMORY MEANS IN CONJUNCTION WITH BATTERY CONDITIONING

[75] Inventor: Steven E. Koenck, Cedar Rapids, Iowa

[73] Assignee: Intermec Technology Corporation, Everett, Wash.

[21] Appl. No.: 82,061

[22] Filed: May 20, 1998

Related U.S. Application Data

[63] Continuation of Ser. No. 879,475, Jun. 20, 1997, which is a continuation of Ser. No. 561,663, Nov. 22, 1995, abandoned, which is a continuation of Ser. No. 134,881, Oct. 12, 1993, Pat. No. 5,508,599, which is a continuation of Ser. No. 769,337, Oct. 1, 1991, Pat. No. 5,278,487, which is a continuation of Ser. No. 544,230, Jun. 19, 1990, abandoned, which is a division of Ser. No. 422,226, Oct. 16, 1989, Pat. No. 4,961,043, which is a division of Ser. No. 168,352, Mar. 15, 1988, Pat. No. 4,805,823, which is a continuation-in-part of Ser. No. 944,503, Dec. 18, 1986, Pat. No. 4,737,702, which is a continuation-in-part of Ser. No. 876,194, Jun. 19, 1986, Pat. No. 4,709,202, which is a division of Ser. No. 797,235, Nov. 12, 1985, Pat. No. 4,746,354, which is a continuation-in-part of Ser. No. 612,588, May 21, 1984, Pat. No. 4,553,081, which is a continuation-in-part of Ser. No. 585,830, Jun. 7, 1982, Pat. No. 4,455,523.

[51] Int. Cl.⁶ H02J 7/00

[52] U.S. Cl. 320/136; 320/107; 320/112; 320/114; 320/134; 320/427; 320/426

[58] Field of Search 320/107, 106, 320/112, 113, 114, 115, 116, 134, 136; 324/426-435

[56] References Cited

U.S. PATENT DOCUMENTS

3,971,980 7/1976 Jungfer et al. .
4,295,097 10/1981 Thompson et al. .
4,377,787 3/1983 Kikuoka et al. .

Primary Examiner—Edward H. Tso

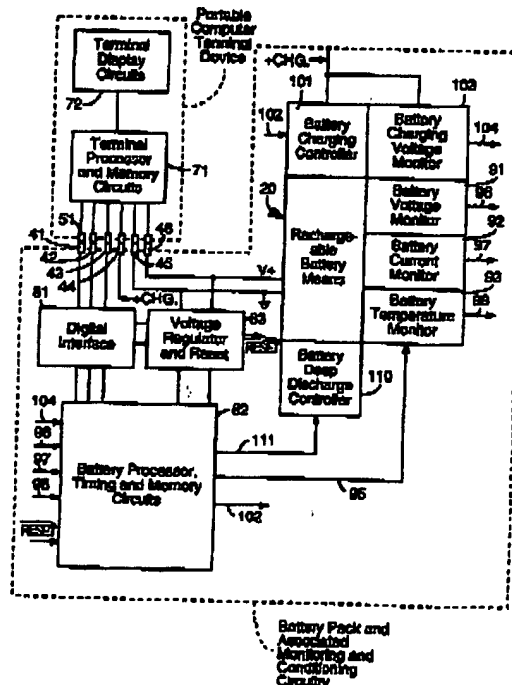
Assistant Examiner—K. Shin

Attorney, Agent, or Firm—McAndrews, Held & Malloy, Ltd.

[57] ABSTRACT

In an exemplary embodiment, a battery conditioning system monitors battery conditioning and includes a memory for storing data based thereon; for example, data may be stored representative of available battery capacity as measured during a deep discharge cycle. With a microprocessor monitoring battery operation of a portable unit, a measure of remaining battery capacity can be calculated and displayed. Where the microprocessor and battery conditioning system memory are permanently secured to the battery so as to receive operating power therefrom during storage and handling, the performance of a given battery in actual use can be accurately judged since the battery system can itself maintain a count of accumulated hours of use and other relevant parameters. In the case of a non-portable conditioning system, two-way communication may be established with a memory associated with the portable unit so that the portable unit can transmit to the conditioning system information concerning battery parameters (e.g. rated battery capacity) and/or battery usage (e.g. numbers of shallow discharge and recharge cycles), and after a conditioning operation, the conditioning system can transmit to the portable unit a measured value of battery capacity, for example.

20 Claims, 24 Drawing Sheets



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Nov 22, 1995

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US005889386A

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[45] **Date of Patent:** Mar. 30, 1999

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- [51] Int. Cl.⁶ H02J 7/00
[52] U.S. Cl. 320/136; 320/107; 320/112;
320/114; 320/134; 320/427; 320/426
[58] Field of Search 320/107, 106,
320/112, 113, 114, 115, 116, 134, 136;
324/426-435

[56] References Cited

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Primary Examiner—Edward H. Tso

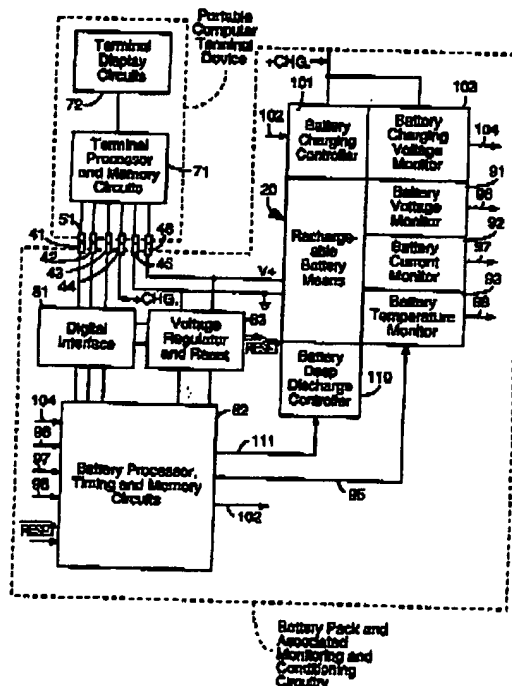
Assistant Examiner—K. Shin

Attorney, Agent, or Firm—McAndrews, Held & Malloy,
Ltd.

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FNC 08/561665